In Support of Bike Lanes on the Mitchell River Bridge
By George Myers, Section 106 MRB Consulting Party

Background[1]

At the first public hearing on September 3, 2009, regarding the design of the replacement for the Mitchell River Bridge (MRB) under MassDOT's Accelerated Bridge Program (ABP), Chatham cyclists expressed the need for safer shared use of the bridge roadway.[2] At a November 13, 2009 work session meeting at the Chatham Historical Society, MassDOT agreed that the existing and proposed 24 foot wide MRB roadways were too narrow and agreed to a design with wider shoulders to accommodate cyclists. Accordingly, MassDOT revised the design of the bridge and presented that design at a second public hearing on November 19, 2009. In that new design, shoulders were added to both sides of the roadway to accommodate cyclists' earlier-expressed concerns and provide an overall bridge width of 44 feet 10 inches, including a 30 foot wide roadway having two 4 foot wide bike lanes, two 1 foot wide crash railings and two 5 feet 9 inch constant width wooden walkways.

Based on community feedback from the November 19 public hearing, MassDOT made further revisions to provide a more "context-sensitive" design which would better echo the aesthetics of the existing MRB. Traffic calming measures were added to the design, including a scored concrete roadway, and the 4 foot wide shoulders to accommodate cyclists were retained. This new context-sensitive design was presented in another design public hearing on March 18, 2010.[3]

Following the March 18 public hearing, on March 23, 2010 the Friends of the Mitchell River Bridge sent a letter to MassDOT, which stated:

> "MassDOT has widened the new bridge from its existing 24 feet to 30 feet, curb-to-curb, supposedly to accommodate cyclists. The effect of this widening will be to increase the speed of vehicles and the safety [sic] of everyone concerned. As pointed out at the hearing, the approaches to the bridge from both east and west do not have shoulders and/or contain parked cars, so that

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[1] This Background is a generally chronological statement of facts relating to MassDOT's reversal of its earlier decision to accommodate the request of cyclists to include bike lanes or wider shoulders on the replacement for the Mitchell River Bridge and is based almost exclusively on the written public record. Any document not on the public record is available from the author upon request.

[2] See MassDOT's MRB "Doing Business Differently" brochure, which generally describes the history of the first public meetings on the MRB design. At the first public meeting on September 3, 2009, the brochure notes that because "cyclists [presumably including members of the Bikeways Committee] expressed the need for safer shared use of the road, shoulders were added to both sides of the roadway." The about-face on shoulders to accommodate cyclists is puzzling.

[3] See MassDOT's Power Point presentation of the March 18, 2010 context-sensitive MRB design and the traffic calming roadway. Compare Slide 8 of this presentation showing the existing MRB with Slide 10 showing a rendering of MassDOT's 44' 10" wide bridge design with the 30 foot wide roadway including 4 foot wide shoulders and 11 foot travel lanes.

adding shoulders for cyclists on the bridge will create an unsafe condition as they enter or leave the bridge."

At its March 29, 2010 meeting, Chatham's Bikeways Committee met and discussed whether the MRB should have bike lanes. The Committee's meeting minutes state:

> "Mitchell River Bridge: From the design standpoint: should the bridge have 1 or 2 bike lanes – or no bike lanes at all? The state is recommending 4′ bike lanes, which is what now is on George Ryder Road. The entire bridge would be 30′ wide. The consensus of the Bikeways Committee is that segregated bike lanes may not be a good idea, but that bicycles should proceed as part of general traffic, since Bridge Street itself does not have bike lanes. The state is proposing scoring the surface of the bridge to help with calming traffic and to give the semblance of a wooden deck. Without bike lanes, the bridge would have 2 – 12′ lanes for all bicycle and automobile traffic. The Committee supports some sort of traffic calming as now proposed with the scoring of a concrete deck.
>
> There is a feeling that the town should post a reduced speed sign for the bridge."

Following that meeting, Jeff Colby, Chatham's DPW Superintendent and the DPW Liaison to the Bikeways Committee, wrote to MassDOT on March 31, 2010 regarding the design of the replacement MRB, including the bike lanes. In his letter Mr. Colby stated:

> "I am writing to you regarding the on-going design for the replacement of the Mitchell River drawbridge in Chatham. A number of residents have expressed their concern that the proposed bridge over the Mitchell River is substantially wider than the existing bridge.
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> I met with the Chatham Bikeways Committee, on March 29, 2010, to discuss the bridge width and the need for dedicated bike lanes.
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> The Chatham Bikeways Committee has taken the position that segregated bike lanes should not be part of the proposed bridge. It was felt that bikes should proceed as part of the general traffic, particularly since Bridge Street does not have dedicated bike lanes.
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> Please consider a bridge design that does not include bike lanes, but rather includes two 12 foot lanes for bicycle and automobile traffic, similar to what exists on the bridge today."

The minutes of the April 26, 2010 meeting of the Bikeways Committee state that the March 29, 2010 minutes were approved and note with respect to the MRB bike lanes

that “Jeff [Colby] passed on to Selectmen and the state Highway Department that the Bikeways Committee is not pushing for bike lanes on the Mitchell River Bridge.”

The Committee′s minutes also state that “[l]ong term plans include multi-use lanes/sidewalks on Bridge Street per the 2007 Town Meeting. We are not advised to hold our breath.”[4]

MassDOT met with the Board of Selectmen at its regular August 17, 2010 meeting to discuss the status of the MRB Project. The spokesman for the Friends of the MRB commented that the Bikeways Committee and the DPW Superintendent had “changed our minds” about bike lanes from the original September 3, 2009 meeting because there are no shoulders on Bridge Street. The Friends′ spokesman then stated that the Bikeways Committee “do[es] not want the bridge to contain bike lanes and please remove them.”

The minutes of the BOS meeting reflect that Mr. Shoukry Elnahal, Director of MassDOT′s Accelerated Bridge Program, stated that the first [September 3, 2009] design was changed for bicyclists, but after consultation with the Bikeways Committee and the Director of DPW, it was changed back [to the narrower 2 foot shoulder].”

On October 1, 2010, the Keeper of the National Register determined that the MRB was eligible for listing on the National Register, which required initiation of a Section 106 proceeding.

In a November 2, 2010 e-mail from Joseph Pavao, MassDOT′s project manager for the MRB Project, to Chatham′s Terry Whalen, Mr. Pavao stated that:

> “MassDOT will pursue a 2′ shoulder (reduced from 4′) as requested by public comment[5] to match the existing structure width. (Town has already provided a letter from the local bike advocates supporting this decision).”[6]

On November 18, 2010, George Myers sent an e-mail[7] to Joseph Pavao, MassDOT′s project manager, stating, *inter alia*, a preference for retaining the 4′ shoulders for cyclists. In that e-mail, he also stated:

> “As a cyclist who has cycled over the Mitchell River Bridge many times, a two foot shoulder for a bike lane is, in my opinion, much too narrow. I personally would prefer the MassDOT original four foot wide shoulder for a bike lane.

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[4] The Bikeways Committee included Bridge Street and the Mitchell River Bridge as part of its Shore Road Spur in Chatham according to the draft of its Bikeways Committee Working Map 2009. See also the Bikeways Committee’s most recent bike trail map “Bicycling in Chatham,” which includes Bridge Street and the Mitchell River Bridge in its Scenic Bike Route.

[5] Presumably, the comment referred to is that of the Friends’ spokesman at the August 17, 2010 BOS meeting.

[6] The 2′ shoulder coupled with the 11′ vehicle travel lane corresponds to a 26′ roadway width, 2′ wider than the existing 24′ roadway width.

[7] See pages 5-11 at this link.

> The fact that there are no bike lanes on Bridge Street as noted by the [Bikeways] Committee in its March 29 minutes is, in my opinion, irrelevant to whether there should be bike lanes on the bridge itself because cyclists, myself included, frequently dismount on the bridge to view Stage Harbor and its surroundings, the boats in Stage Harbor, the Mitchell River, and people fishing from the bridge walkways. To my knowledge, there has never been a prohibition against cyclists stopping on the bridge. A four foot wide bike lane on either side of the bridge would clearly be a safer alternative to two foot wide lanes. I also see no need to 'match the existing structure width' as advocated by some."

On November 20, 2010, Mr. Pavao e-mailed the following response[8]:

> "Thank you for your comments and for your support for the project. Although I was not part of the previous public meetings, I have read all of the meeting minutes and recently had a meeting with the Town in order to fully understand the public issues. As you mention in your email, my direction to the design consultant to pursue the 2′ shoulder as opposed to the original 4′ shoulder was a result of comments received from the previous public meetings. It appears that the general comments had to do with keeping the bridge at the current width both from an aesthetic reason and also to discourage drivers from traveling at higher speeds due to a wider bridge. As you also mention, the Town Officials and the Bikeways Committee have also endorsed this approach. It is also important to note that the approaches on either side of the bridge currently have no shoulders along Mitchell Road [sic – Bridge Street] and I do not believe that there are any plans by the Town to widen and restripe wider shoulders in this area. This among other design considerations was the basis of our direction to the consultant. If you would like to discuss this particular issue, please call me and I would be happy to discuss this issue with you."

In early February 2011, George Myers spoke to Ron Holmes, the Bikeways Committee chairman, regarding bike lanes on Bridge Street and the proposed replacement for the MRB and offered to attend the next Committee meeting to discuss the bike lanes. Prompted by that offer, Mr. Holmes agreed to have the Committee reconsider the MRB bike lanes at its February 28, 2011 meeting and whether it might have Mr. Myers speak at its March meeting.

The Bikeways Committee did reconsider and confirm its earlier decision regarding MRB bike lanes as reflected in the minutes of its February 28, 2011 meeting which state:

> "Mitchell River Bridge bike lanes. A year ago, the Bikeways Committee decided not to push for bike lanes on the ′new′ Mitchell River Bridge. Karen doesn′t think bike lanes are safe when there are high curbs on the side.

[8] See page 5 at this link.

> Wayne added that even if bike lanes are someday added to Bridge Street, people will park in the bike lanes during summer. In general, the feeling is that traffic is very slow on the bridge and that bicyclists are not in inordinate danger crossing the bridge. Jeff Colby indicated that adding bike lanes would require substantial widening of the bridge. The committee is in favor of supporting last year's decision."

In the April 28, 2011 Bridge Alternatives Evaluation document, on page 10, MassDOT states that:

> "The 26′-0″ roadway accommodates two 11′-0″ lanes with 2′-0″ shoulders each side. The 2′-0″ shoulders were reduced from previous 4′-0″ bike lanes at the request of the Town of Chatham and supported by the Bikeways Committee. Currently there are no bike lanes along Bridge Street."

During the Section 106 proceeding for the MRB, consulting parties were requested to comment on MassDOT's Bridge Repair/Rehabilitation Feasibility Study, Bridge Alternatives Evaluation and Life Cycle Cost Comparison and the Addendum thereto by June 8, 2011. The comments of consulting party George Myers included the following relating to the MRB bike lanes:

> "I also propose increasing the shoulders of the alternative selected by MassDOT to 4-feet from 2-feet to provide a safer accommodation for bike traffic on the MRB. It is puzzling that Chatham's Bikeways Committee did not welcome and approve MassDOT's originally proposed 4-foot bike lanes, despite the present lack of bike lanes on Bridge Street. Notably, the Bikeways Committee has included Bridge Street and the MRB as part of its Shore Road Bike Spur in Chatham according to the draft of its Bikeways Committee Working Map of 2009. Moreover, as the Committee itself has noted, long term plans include bike lanes on Bridge Street. In view of those long term plans and the inclusion of Bridge Street and the MRB in the Shore Road Bike Spur, it is shortsighted not to include 4-foot bike lanes on the MRB replacement. A 4-foot shoulder on each side of the bridge, even if not formally designated as bike lanes, would be substantially safer for cyclists who occasionally stop on the bridge to photograph or enjoy the view of Stage Harbor or watch the fishermen on the bridge walkways."

The Section 106 proceeding continued with additional meetings and correspondence, which culminated on May 14, 2012 with the signing of a Memorandum of Agreement (MOA) by the Advisory Council on Historic Preservation. The MOA provides that MassDOT will construct the Alternative 3 bridge design that appears in FHWA's conceptual drawings attached to its Section 106 Adverse Effects submittal dated November 9, 2011.

In an undated letter (probably early March 2012), Ms. Carol Pacun, a Chatham resident representing certain named residents of Bridge Street in Chatham, urged MassDOT to

consider the safety of pedestrians, drivers and homeowners "if the [Alternative 3] design of the Mitchell River Bridge results in an actual increase in the current speed of vehicles on Bridge Street and the bridge itself." Ms. Pacun also noted that:

> "This is an area where vehicles, walkers, bicycle riders and fishermen (mostly children) converge. . . . Many residents feel that speeding along the road and the bridge is already an issue[9], and that MassDOT's goal should be to design the bridge and the pavement around it in such a way to mitigate their concerns. . . . these residents would prefer that speeding issues be dealt with in the design of the bridge and by the town setting low speed limits, rather than the addition of calming devices such as speed bumps and flashing lights, which would not be compatible with the site."

MassDOT responded in a letter dated March 16, 2012[10] noting the reduction of the travel lanes from the 30′ originally proposed to 26′ in a design supported by the BOS and the Bikeways Committee because the town has no future plans to widen the Bridge Street approaches to the MRB. In that letter, MassDOT also stated that the Alternative 3 bridge "will be safer for all users of the bridge."

Chatham's Bikeways Committee met on June 18, 2012 to hear a presentation by George Myers and public comment regarding the inclusion of bike lanes on the Alternative 3 design of the MRB. A question and answer period followed the presentation along with comments by Selectman Tim Roper and Chatham's Coastal Resources Director, Ted Keon. The Committee then voted 3-2 (two members absent) to maintain its previously stated position not to include bike lanes on the MRB.

The Reasons Why the Mitchell River Bridge Should Have Marked Bike Lanes

Regulatory Requirements, Guides and Policies Regarding Bicycle and Pedestrian Accommodation

Massachusetts General Laws Ch. 90E Sec. 2A "Accommodation of bicycle and pedestrian traffic in construction projects" provides:

> "The commissioner shall make all reasonable provisions for the accommodation of bicycle and pedestrian traffic in the planning, design, and construction, reconstruction or maintenance of any project undertaken by the department. Such provisions that are unreasonable shall include, but not be limited to, those which the commissioner, after appropriate review by the bicycle program coordinator, determines would be contrary to acceptable standards of public safety, degrade environmental quality or conflict with existing rights of way."

[9] At its February 28, 2011 meeting, the Bikeways Committee concluded otherwise, stating its feeling that "traffic was very slow on the bridge."
[10] Ms. Pacun's letter is included in this link.

Under this statute, MassDOT is ***required*** to accommodate bicycle and pedestrian traffic in the replacement of the MRB.

Federal law likewise provides in 23 USC §217 – Bicycle Transportation and Pedestrian Walkways, as follows:

> **(e) Bridges.—** In any case where a highway bridge deck being replaced or rehabilitated with Federal financial participation[11] is located on a highway on which bicycles are permitted to operate at each end of such bridge, and the Secretary determines that the safe accommodation of bicycles can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations.

In addition, the U.S. Department of Transportation, FHWA, has set forth a Policy Statement (updated as of May 7, 2012) regarding the accommodation of bicycles and pedestrians in new construction and reconstruction projects. One of the important steps of that policy that is directly relevant to the MRB, and especially to the rationale for not including bike lanes on the MRB[12], states:

> "Planning projects for the long-term. Transportation facilities are long-term investments that remain in place for many years. The design and construction of new facilities that meet the criteria in item 1) above [the MRB project does meet that criteria] should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements. For example, a bridge that is likely to remain in place for 50 years, might be built with **sufficient width** for safe bicycle and pedestrian use in anticipation that facilities will be available at either end of the bridge even if that is not currently the case."

While that aspect of FHWA's policy does not appear to be mandatory for the MRB, its application to the MRB is sensible for many reasons, including the long term plan to include multi-use lanes/sidewalks on Chatham streets, such as Bridge Street according to Article 12 of Chatham's 2007 Town Meeting, and as described in the Bikeways Committee minutes of April 26, 2010.

Even if there is no immediate need or future plan to implement bike lanes or wider shoulders on the MRB for any reason, e.g., may encourage speeding, lack of Bridge Street bike lanes, etc., it is shortsighted not to provide an additional 10% width (4 feet) to the Alternative 3 design (44′ 10″ vs. 40′ 11″). The actual roadway width of a 4 foot wider replacement bridge can always be reduced to the 26 feet of the Alternative 3

[11] FHWA is providing 80% of the ABP funding for replacement of the MRB; the Commonwealth is providing the remaining 20%.

[12] The "rationale" referred to is argument that bike lanes are unnecessary on the MRB because Bridge Street presently has no bike lanes.

design (11′ travel lanes, 2′ shoulders) or even to the 24 feet of the existing MRB (12′ travel lanes, no shoulders) simply by moving the 2′ 8″ high crash rails inwardly toward the bridge centerline on both approach spans and the bascule span. That would provide even greater protection for pedestrians and fishermen on the walkways, though cyclists would have less protection. On the other hand, if the present Alternative 3 roadway width of 26 feet is maintained, it would be impossible to increase the narrower 2′ shoulder widths in the near or distant future without a corresponding reduction in either the 11′ wide travel lanes or the 5′ wide walkways for pedestrians and fishermen. For that reason alone, common sense dictates increasing the width of the Alternative 3 design by 4 feet for the safety of all users of the bridge, particularly cyclists.

In a Power Point presentation dated March 30, 2010 concerning its Bicycle & Pedestrian Accommodation Policy, MassDOT states at slide 11, consistently with the aforesaid FHWA policy, that:

> "**We also look at the potential future development of the roadway the bridge is part of. If the roadway might eventually be widened for better accommodations to all users we would consider increasing the cross section of the bridge to match the future roadway widening.**"

Other states and transportation authorities have also implemented the FHWA policy[13] or similar policies. Minnesota, for example, states in its MN/DOT Bikeway Facility Design Manual at page 170 that:

> "Where future demand for a bikeway is anticipated, even if current bicycle use is minimal, new highway bridges and bridge rehabilitation should be planned, designed, and constructed with **sufficient width** to accommodate bicycle and pedestrian traffic. Bicyclists on highway bridges can be accommodated with a separated bike path, shoulders, bike lanes, wide curb lanes, or sidewalks."

The Santa Clara Valley [CA] Transportation Authority mandates in its VTA Bicycle Technical Guidelines of December 13, 2007 at Section 3.1.4: "If the approaching roadway does not have bike lanes and/or sidewalks, then the bridge shall be provided with minimum of five foot shoulders and five foot sidewalks on both sides of the overpass or underpass."

A bridge very similar to the Alternative 3 design was constructed in May 2009 by NHDOT across Seavey Creek, a tidal saltwater creek in U.S. navigable waters, on NH Route 1A in Rye, NH.[14] The Route 1A roadway approaches east and west of the Seavey Creek Bridge are 22 feet wide with no formal shoulders or bike lanes.[15] The Seavey Creek Bridge was a National Register-eligible, all timber bridge that was replaced with a 144-foot long hybrid timber/concrete/steel bridge. The old bridge had a

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[13] See, e.g., Wisconsin DOT's Bicycle Facility Design Handbook (2004, updated 2009) at Sec. 4.16, page 4-71.

[14] The Seavey Creek Bridge Project is described in detail in NHDOT's Seavey Creek Bridge Section 4(f) Environmental Study (Seavey Study).

[15] A future project will add bicycle paths/shoulders to Route 1A west of the bridge. Seavey Study at pages 1, 8.

22-foot wide wooden roadway comprising two 11-foot travel lanes with no shoulders and a 4-foot wooden sidewalk on each side of the roadway, similar to the existing MRB.

The new Seavey Creek Bridge is provided with a 30-foot wide roadway (11-foot travel lanes and 4-foot shoulders for bike travel) and two 5-foot sidewalks on each side of the bridge separated from the travel lanes by wooden crash railings with an overall width of 45 feet 2 inches, a cross-sectional arrangement virtually identical to that of the 44 foot 10 inch widened Alternative 3 bridge proposed herein.[16] Significantly, the Seavey Study (n.13) notes at page 8 that the "new bridge project will be a great improvement to the safety of bicyclists, pedestrians and motorists, allowing shoulders for the bicyclists and pedestrians to be out of the main travel way."

For all the foregoing reasons, the fact that there are presently no bike lanes on Bridge Street does not justify the decision to exclude marked bike lanes or wider shoulders on the Alternative 3 MRB replacement.

Chapter 17 of the Illinois Bureau of Design and Environmental Manual relates to Bicycle and Pedestrian Accommodations. At page 17-2(44) the manual notes, with respect to bike path widths on bridges, that "additional width [of a bike path] may be warranted on structures over rivers where users would likely stop to enjoy the view." That is, of course, equally relevant to the MRB, particularly in view of a number of additional reasons why cyclists are likely to stop on the MRB besides the stunning views of Stage Harbor, including observing fishermen on the walkways, shell fishermen in the river and on the river banks, boaters passing beneath the MRB, moored boats on both sides of the MRB and even the structure of the drawbridge itself.

Massachusetts Executive Office of Transportation (MassEOT) and Massachusetts Department of Transportation (MassDOT or MassHighway) provide a number of plans, guides and policies relating to the accommodation of bicycles and pedestrians on roadways of the Commonwealth consistent with M.G.L. Ch. 90E Sec. 2A. See, e.g., the Massachusetts Bicycle Transportation Plan of MassEOT. MassDOT's MassHighway Engineering Directive E-09-005 dated August 21, 2009 establishes the design criteria and review procedure to be applied to MassDOT projects regarding bicycle and pedestrian accommodation, including those under the ABP[17].

For Non-National Highway System (NHS) projects such as the MRB Project, the roadway design criteria are found in the MassHighway Project Development and Design Guide (Guide), particularly in Chapter 5 – Cross-Section and Roadway Elements.

[16] See Exhibit 6D on page 28 of the Seavey Study.
[17] Directive E-09-005 is currently being rewritten.

Directive E-09-005 provides in the section entitled “Typical Bicycle Accommodation”:

> “Bicycle accommodation shall be in accordance with Chapter 5 of the Guide and the 1999 AASHTO Guide for the Development of Bicycle Facilities.[18]
>
> In general, desirable bicycle accommodation is achieved with a 4’ paved shoulder adjacent to a 12′ travel lane or with a 16’ shared lane (with approved signage.) Minimum bicycle accommodation is achieved with a 15’ combined travel lane and shoulder.”

Therefore, the roadway width of the Alternative 3 design (26 feet) does not meet the minimum bicycle accommodation (30 feet) of E-09-005 and would require a Design Exception to be submitted to the Bicycle and Pedestrian Accommodation Engineer (BPAE) according to that directive, as follows:

> “Bicycle accommodation is an important consideration in the development of roadway widths. When using either the Guide or the Green Book, use of the minimum lane and shoulder widths [15 feet combined travel lane and shoulder] provides minimum bicycle accommodation. Use of a lower combination of lane and shoulder widths would compromise bicycle accommodation and would require additional justification in a Design Exception.
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> Design criteria and any required Design Exception shall be reviewed and approved at the 25% design stage. The design submission shall include a narrative describing the rationale for choosing selected design criteria. This should normally be in the form of a Functional Design Report. The report shall also include a narrative describing the efforts the project designer has taken to improve bicycle and pedestrian accommodation.”

The MRB Project is presently still at the 25% design stage according to the MOA. Therefore, it is submitted that it is appropriate to take up the MRB bike lane issue with FHWA and MassDOT promptly and no later than the final consulting parties meeting to take place in Chatham at a date to be announced. According to the flow chart at slide 12 of the aforesaid MassDOT Bicycle & Pedestrian Accommodation Policy Power Point presentation, a public hearing is to be held after the 25% design is found to meet the required bicycle and pedestrian accommodations or the failure of the design to meet the requirements is otherwise justified.[19]

[18] The 1999 AASHTO Guide was recently superseded by the 2012 Guide 4th Edition and is available for download for $120 to AASHTO members.

[19] It is also noted on slide 12 that Accelerated Bridge Program projects must be reviewed for compliance with bicycle and pedestrian accommodation.

Traffic Calming Measures

Safety concerns with the proposed MassDOT designs have been expressed by the Friends of the MRB and the residents of Bridge Street because of the potential for increased speeding of motor vehicles along Bridge Street and on the MRB itself. In particular, the increased roadway width of the Alternative 3 design from 24 feet to 26 feet and the earlier design roadway width of 30 feet and the reduction or partial leveling of the road dips (sag curves) at the ends of the MRB are cited as encouraging motor vehicle speeding. Some of the usual traffic calming measures, such as flashing lights and rumble strips, are said by those parties to be not in keeping with the historical site of the MRB.

Apart from lowering speed limits[20] and vigorous law enforcement of those limits, one of the most widely used traffic calming measures is on-road marked bike lanes. FHWA's Traffic Calming website lists bike lanes as a traffic calming technique and describes a bike lane as a "portion of a roadway which has been designated by **striping, signing, and pavement markings** for the preferential or exclusive use of bicyclists."[21]

Textured or scored pavement is another traffic calming measure listed by FHWA and was included in MassDOT's March 18, 2010 context-sensitive design that was rejected by the preservationist consulting parties during the Section 106 proceeding.

Chapter 16 Traffic Calming and Traffic Management of MassDOT's Project Development & Design Guide includes bike lanes and minimal travel lane widths as traffic calming measures. Sections 16.5.9.1 Bicycle Lanes and 16.5.9.2 Travel Lane Width on page 16-19 describe those measures as follows:

> 16.5.9.1 Adding an on-street bicycle lane, as shown in Exhibit 16-10, reduces the pavement width for motor vehicles, while at the same time providing for bicycle travel.
>
> 16.5.9.2 Minimal lane widths can reduce vehicle speeds, reduce pedestrian crosswalk distances, and maximize the space available for bicycle lanes and sidewalks.
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> Where traffic calming is intended, driving lane widths should be 10 feet[22], a width widely accepted as appropriate for residential and minor collector streets. A larger lane width (11 feet) is appropriate for outer (curb) lanes on

[20] In its March 16, 2012 response to Ms. Pacun's letter on behalf of Bridge Street residents, MassDOT noted that the proposed design speed of 30MPH is not the required posted speed limit for the MRB. The Town of Chatham presumably has the authority to set the speed limit on the MRB at any appropriate level, e.g., 15 MPH, and even to lower the speed limit on Bridge Street.

[21] Bridge Street residents might also benefit from the addition of marked bike lanes on their street to reduce speeding.

[22] As previously noted, the width of the travel lanes of the Alternative 3 design is 11 feet.

> streets where on-street parking is not present and on arterials or other roadways that carry large numbers of trucks and buses.
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> Lane layouts should also take into consideration space for bicycles, as described in Chapter 5. Traffic calming measures that reduce the travel lane width may reduce or eliminate the opportunities for motor vehicles drivers to overtake bicycles sharing the same lane. Where such overtaking is impossible, motor vehicle speed is likely to be determined by bicyclist speed. Thus, the presence of bicyclists becomes a significant element of traffic calming.[23]

Just as importantly, according to one literature review[24], on-road marked bike lanes have been found to reduce bicycle crashes and injuries to bicyclists. In that review, the authors state that:

> "On-road marked bike lanes were found to have a positive safety effect in five studies, consistently reducing injury rate, collision frequency or crash rates by about 50% compared to unmodified roadways . . . . Three of those studies . . . found a similar effect for bike routes. One study . . . found that there was an increase in crash rates in the year following installation of marked bike lanes on a major road, especially for a section counter to on-road traffic flow, but this effect was not sustained over the long term. . . .
>
> The principal trend that emerges from the papers reviewed here is that clearly-marked, bike-specific facilities (i.e. cycle tracks at roundabouts, bike routes, bike lanes, and bike paths) were consistently shown to provide improved safety for cyclists compared to on-road cycling with traffic or off-road with pedestrians and other users. Marked bike lanes and bike routes were found to reduce injury or crash rates by about half compared to unmodified roadways."

In its March 23, 2010 letter to MassDOT, the Friends contend that, because there are parked cars and/or no shoulders for cyclists on the east and west approaches to the bridge, adding shoulders (or presumably marked bike lanes) for cyclists on the bridge will "create an unsafe condition as they enter or leave the bridge." Even apart from the above finding that marked bike lanes improve the safety of cyclists, the facts do not support the Friends' contention. Cyclists "entering" the bridge from either the east or west direction will ride from a minimum- or non-shouldered approach roadway to a shoulder or marked bike lane on the bridge roadway that is at least four feet wide. As for cyclists "leaving" the bridge, assuming the bridge itself is provided with 4 foot wide marked bike lanes, motorists exiting the bridge in either direction will be forewarned, not only of the presence of cyclists on the bridge, but also of cyclists exiting the bridge.

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[23] It should also be noted that marked bike lanes are not universally considered to calm traffic.

[24] Reynolds, Conor, et al. (2009) "The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature," Environmental Health.

It would also be a relatively straightforward safety feature to extend the marked bike lanes from the bridge at least an additional 150 feet along the Bridge Street roadway shoulders on both the eastern and western approaches to the MRB.[25] Such additional marked bike lanes will provide Bridge Street motorists with an even earlier warning of the presence of cyclists approaching, riding on and exiting the bridge in either direction.[26] If necessary, the extended bike lanes could be designated no parking zones.

Based on the foregoing, the addition of marked bike lanes on the MRB, its approaches and eventually on Bridge Street, will perform a traffic calming function and should address the concerns of the Friends regarding the safety of cyclists on the bridge, as well as the concerns of Bridge Street residents and the Friends regarding speeding on the bridge and on Bridge Street.

The Timber Roadway Surface of the Alternative 3 Design

According to the Alternative 3 design, the roadway wear surface is transversely level and constructed of 3-inch thick sawn lumber timbers arranged longitudinally of, i.e., parallel to, the bridge centerline. The timber wear surface will be fastened in some manner to an underlying 5 1/8" Glulam or timber deck. See the drawings on pages 25-26 and especially the photographic rendering of the longitudinal orientation of the roadway timbers on page 33 of MassDOT/FHWA's Adverse Effects letter dated November 9, 2011. The written record presently available to the author does not state the reason(s) for changing the orientation of the MRB roadway timbers from the existing diagonal orientation to a longitudinal orientation.[27]

Apart from previously expressed concerns about rapid deterioration of a timber roadway because of water seepage into the interstices between the timbers, the longitudinal orientation of the wear surface timbers in the Alternative 3 design may pose a significant danger to cyclists on the bridge. As is evident from the present condition of the MRB roadway wear surface, adjacent diagonally oriented timber planks, especially those recently replaced next to older ones, have created "lips" or height differences between some of them. Just as height discontinuities between a curbing plate or gutter and a concrete or asphalt road surface can cause spills and crashes of bicyclists[28], especially those less experienced, so also can the lips or height differences that will exist or eventually occur between adjacent longitudinally oriented planks of the Alternative 3

[25] The plans for the Alternative 3 replacement bridge call for modification of the bridge profile on the eastern Bridge Street approach roadway for a distance of about 140 feet and on the western approach roadway for a distance of about 75 feet. See page 30 of FHWA's November 9, 2011 Adverse Effect Finding. There is ample space available on the western roadway approach to extend the marked bike lanes for 150 feet or more from the bridge.

[26] Needless to say, appropriate signage for warning motorists of the presence of cyclists will further aid in traffic calming.

[27] One possible reason is that longitudinally oriented timbers will reduce the "bumpiness" of the ride over the MRB for both motor vehicles and cyclists, but as noted below, such bumpiness may perform a traffic calming function in the nature of rumble strips.

[28] The 1999 AASHTO Guide for the Development of Bicycle Facilities at page 23 recommends that the "longitudinal joint between the gutter pan and pavement surface [be] smooth" for the obvious reason to prevent cyclist crashes.

roadway. A damp or wet roadway surface will exacerbate the likelihood of crashes on the Alternative 3 timber roadway with longitudinally oriented timbers.

Maintaining the present diagonal orientation or, better still, using a transverse orientation of the roadway wear surface timbers will reduce the incidence of cyclist crashes on the MRB because the bicycle wheels will engage the “lips” generally perpendicularly. The disadvantage for cyclists, of course, is that the 200 foot ride over the MRB will become more and more uncomfortable as the timbers begin to deteriorate with time. However, a further advantage of diagonally or transversely oriented wear surface timbers is traffic calming because, especially over time, the timbers inherently function as rumble strips as they do on the existing bridge at the present time. **(N.B. 6-30-13 MassDOT has changed the roadway timber orientation to diagonal.)**

Another solution for the improved safety of cyclists is possible, but may not be acceptable to those who prefer an all-timber roadway. For example, constructing 4 foot wide concrete or asphalt marked bike lanes adjacent the 11 foot wide timber-surfaced travel lanes will provide a safer and more comfortable ride for cyclists.

Conclusion

For the foregoing reasons, it should be apparent that, for the safety of cyclists of all experience levels, there is a need - and a requirement under federal and Commonwealth law and directives – to include on-road marked bike lanes or wider shoulders on the replacement MRB, unless there is specific justification for excluding them. The mere absence of bike lanes on the Bridge Street approaches to the MRB does not justify a decision not to include bike lanes or wider shoulders in the Alternative 3 design under FHWA and MassDOT directives and guides, especially in light of the future possibility that bike lanes will be provided on Bridge Street. Marked bike lanes and reorientation of the roadway timbers will provide a measure of traffic calming on the MRB. For the added safety of cyclists riding over the MRB, serious consideration should be given to improving the proposed Alternative 3 roadway travel surface for cyclists by reorienting the wear surface timbers, or by providing separate concrete- or asphalt-surfaced bike lanes.

Because Chatham is a resort community and a vacation destination for thousands every year, a substantial number of whom cycle our scenic roads, it is important that our local bike routes, including the Scenic Bike Route along Shore Road and Bridge Street are made as safe as possible for visiting cyclists of all ages and skill levels, as well as for Chatham’s own cycling residents.

Respectfully submitted,

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